Maternal Health Care: The Case of Iron Supplementation in India

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Abstract

Prenatal care is an essential segment of maternal health-care. In this paper an attempt has been made to examine the socioeconomic determinants of maternal iron supplementation and sufficient maternal iron supplementation as components of prenatal care. Micro-data having 25999 and 19764 observations for two models, i.e. maternal iron supplementation and maternal sufficient iron supplementation respectively has been taken from Indian Demographic and Health Survey (IDHS) 2005-6. To estimate the probability in both the models binary logistic regressions have been employed. The explanatory variables categorized into individual characteristics of the woman, household characteristics, health-related characteristics, community characteristics and regional characteristics have been embraced in the analysis. The results of the first model revealed that probability of iron supplementation is augmented by woman' education, woman' age at first marriage, woman's working status, husband's age, husband's education, husband's presence at prenatal visit, final say on woman's health (by woman, woman and husband collectively and even husband alone as compared to someone else) and household covered by the health insurance. The birth-order of the child, woman's living in small city and town as well as wealth index of the household slides down the probability of iron supplementation. The estimates of the second model explained that probability of sufficient iron supplementation is positively influenced by woman's age at first marriage, woman's education, husband's age, husband's presence at prenatal visit, final say on woman's health-care (husband alone) and household wealth. The birth-order of the child and small city as place of residence negatively affect the likelihood of sufficient iron supplementation. The study proposed the targeted approach to enhance iron supplementation and sufficient iron supplementation in Indian women. The marginalized households should be targeted through cash transfer programs. Furthermore, the small cities and country sides should also be focused. The awareness and education of woman

along with husband's participation in maternal health-care cannot be ignored in policy making.

Keywords: Woman health; newborn health; South Asia; prenatal care; pregnancy; micronutrient supplementation; fertility.

1. Introduction

Maternal health is the peculiar problem in developing countries. Maternal mortality, neonatal mortality and low birth-weight are major outcome indicators of maternal health. The input indicators include prenatal-care, postnatal-care and fertility control. In the prenatal-care, iron supplementation is one of the important components of maternal health in developing economies[1].

Maternal anemia is defined as hemoglobin (Hb) < 110 g/L or 115 g/L in clinical practices with a slight variation according to the trimester of pregnancy. However, a hemoglobin level <100 g/L denotes anemia at every stage of pregnancy that should be investigated and treated because of possible serious effects for mother and her baby. They may be increased risk of intrauterine growth retardation, low birth-weight, smaller head circumference and premature birth (Allen 2000; Scholl 2005). One of the most frequent causes of anemia is iron deficiency. Pregnant women are generally at high risk for iron deficiency (Izci-Balserak and Pien 2010). One of the reasons for iron deficiency may be the low intake of iron from the diet by inadequate intake of meat, fruits and vegetables. The situation is aggravated in pregnancy because during pregnancy iron demand is increased in order to allow the growth of feto-placental unit (Scholl 2005). The high physiological demand for iron in pregnancy is hard to meet through dietary intake of iron-rich food alone. Therefore if is recommended that pregnant women should routinely receive iron supplementation at least for three months during pregnancy.

In India, 51.2 percent of the pregnant women are anemic while 34.9 percent are mild anemic. The moderate and severe anemia is 14.6 and 1.7 percent respectively[2]. The iron supplementation in pregnant women is a promising strategy for reducing adverse pregnancy outcomes in the country. The provision of iron and folic acid tablets to pregnant women is an integrated part of safe motherhood offered by Reproductive and Child Health Program. The program recommends the women to consume 100 tablets of iron and folic acid during pregnancy. Why the iron supplementation is low, is the research question to be answer in this paper.

Although some researchers have raised concerns that micronutrients supplementation may increase prenatal mortality, risk of preterm birth and smaller gestational-age infants (Hemminiki and Rimpela 1991; Preziosi et. al. 1997). Some of the studies have shown no relationship between iron supplementation and pregnancy outcomes (Lagiou et. al. 2005; Singh et. al. 2012). Hwang et al. (2013) concluded that excessive maternal iron supplementation is associated with reduced fetal growth. The study suggested that iron supplementation of low dose instead of high dose may be better option for the pregnant

[1] The iron supplementation has also been widely used in the literature as component of prenatal-care (Lavado, et, al. 2011; Tran, et. al. 2011)

[2] In the developing countries the prevalence of anemia ranges from 27 percent in Bolivia and 28 percent in Egypt to 60 percent in Uzbekistan. In Cambodia and Haiti more than 50 percent of women are anemic.

women. The World Health Organization (WHO) has recommended iron and folic acid supplementation to reduce the risk of iron deficiency among pregnant women. Many developing countries including India have systems for delivery of iron and folic acid supplementation.

In India, 75 percent of the women utilize prenatal-care, 52 percent of the deliveries are attended by skilled health workers and only 48 percent of the women receive iron and folic acid supplementation during pregnancy. Adolescent fertility rate (births per 1000 women ages 15-19 years) is 77. All of these factors results into maternal mortality rate of 200 per 100,000 live births.

In this background, we focus on India to see why maternal iron supplementation (iron supplementation in coming pages) in the reproductive age group of 15-49 years is lower and why the sufficient amount of maternal iron supplementation (sufficient iron supplementation in coming pages) is not taken by the women. The core objective of the study is to analyze the socioeconomic determinants of iron supplementation and sufficient iron supplementation by two independent models and to frame policy proposals to enhance iron supplementation in the country.

2. Literature Review

In the earlier literature a number of studies have focused on maternal health-care including the micronutrient supplementation. For instance, Galloway and McGuire (1994) explained the factors of non-compliance with iron deficiency treatment through review of literature. They concluded that inadequate program support (lack of political commitment and financial support), insufficient service delivery (poor provider-user dynamics, lack of supplies, access, training, and motivation of health-care professionals) and patient factors (misunderstanding of instructions, side effects, frustration about the frequency and number of pills taken, migration, fear of having big babies, personal problems, nausea that accompanies pregnancy, and the subtlety of anemia which make demand for treatment low) are the causes of non-compliance of iron supplementation.

Seck and Jackson (2008) have also identified the determinants of low compliance of iron supplementation as experience of side effects and misunderstanding about taking the tablets throughout pregnancy. The study proposed the provision of clear instructions about iron tablets and educating the women about health benefits of iron supplementation. Titley et al. (2010 for Indonesia) in their study regarding the prenatal and postnatal care services have also examined the sufficient iron supplementation in rural community. The factors identified for lacking sufficient iron supplementation were the receiving of less than recommended dose of iron/folic acid during prenatal visit. The women attending less than four visits receive further less dose of supplementation. The adverse effects of the iron supplementation such as nausea disclosed by the women and traditional beliefs about the effects of supplementation emerged as the reasons for failing the sufficient supplementation. Discussing on maternal-care practices in ultra-poor households, Choudhury and Ahmed (2011) from Bangladesh have revealed that women did not take all the tablets dispensed because they perceive the tablets to be tasteless (or have bad taste) and making the stool black. Most of the women opined that prenatal-care provides no benefits to them and their child. Monetary constraints, lack of knowledge about the need of service and restriction on the movement of women have also been identified as the reasons for not accessing the prenatal-care.

Singh et al. (2012 for India) has analyzed the impact of iron and folic acid supplementation along with utilization of prenatal-care and tetanus toxoid vaccination on neonatal mortality. The study concluded that iron and folic acid supplementation has no significant effect on neonatal mortality.

Using the nationwide data and explaining the impact of socioeconomic factors on not only supplementation of iron but sufficient iron supplementation is focus of the current study and that is the originality of the analysis.

3. Data Set and Methodology

3.1 Data Set

For estimating the determinants of iron supplementation, the micro-data has been taken from Indian Demographic and Health Survey 2005-06 (IDHS). The IDHS is a demographic, socio-economic and health survey program devising data on family planning, reproductive health, maternal and child health, nutrition, immunization, education and employment.

3.2 Measuring Iron Supplementation

To examine the determinants of iron supplementation and sufficient iron supplementation by two models, the first dependent variable (Iron supplementation) is based on the answer to the question asked by IDHS, i.e. did you (respondent woman) have taken iron supplementation (in the form of tablets and syrup) in the last pregnancy or not. The respondent has response either yes or no.The response for question is coded as 1 if the woman received iron supplementation otherwise zero. It forms the dependent variable (Iron supplementation) as binary variable.

In India 100 tablets of iron and folic acid are recommended during pregnancy. Another recommendation for sufficient iron supplementation is intake of iron and folic acid supplementation in the form of syrup or tablet for 90 days[3]. For the second model, the variable sufficient iron supplementation is based on the question asked by IDHS from the respondent (woman) that how many days you have taken iron supplementation. If the woman has taken iron supplementation for 90 or more than 90 days[4], it is taken as sufficient iron supplementation and coded as 1, otherwise zero. So in the analysis 90 days of iron supplementation is the benchmark for sufficient iron supplementation[5].

3.3 Selection of Explanatory Variables

The general determinants of medical-care in developing countries are: socio-demographic characteristics, disease-related characteristics, household characteristics, community characteristics and regional characteristics, etc. The determinants of maternal health-care (in the case of iron supplementation) may be external environment (region and type of residence), predisposing factors (socio-demographic: woman's age at first marriage, woman's working status, maternal education, paternal education, maternal final say on

[3] In Indonesia ninety tablets of iron/folic acid are recommended during pregnancy.

[4] Only 23 percent of the Indian pregnant women take the iron supplementation for recommended 90 days.

[5] Although, Habib et al. (2009) have categorized the iron supplementation as strong compliance, partial compliance and non-compliance.

her own health-care, birth-order and birth-interval of the child, family structure, family size and household wealth index,; health knowledge: frequency of reading newspaper, frequency of listening to radio, frequency of watching television, knowledge of pregnancy complications, knowledge of delivery complications, knowledge of post-delivery complications), enabling factors (know where to go to seek health services, permission to visit health services, money to pay health services, distance to health services, transportation to health services, presence of companion, availability of care by female health workers, health insurance coverage, welfare benefits) and need factors (pregnancy complications, desire for pregnancy, parity, planned pregnancy, medically assisted pregnancy, high risk status during pregnancy, ever-terminated pregnancy).We have attempted to cover all the characteristics discussed above in our analysis by selecting the variables from IDHS subject to availability.

3.4 Model Specification

Our models have dependent variables as binary variables. So we have utilized the multivariate binary logit models. The iron supplementation and sufficient iron supplementation are affected by a set of explanatory variables. These variables are classified into five categories, so the general function of iron supplementation and sufficient iron supplementation is given as:

Iron supplementation / Sufficient iron supplementation= f (individual characteristics, disease-related characteristics, household characteristics, community characteristics, regional characteristics)

For iron supplementation and sufficient iron supplementation, the models are expressed in equation 1 and 2 respectively.

$$IRONS = f(\beta_0+\beta_1 WAGEM + \beta_2 WEDU + \beta_3 WWORK + \beta_4 ETPREG + \beta_5 BORD + \beta_6 HAGE + \beta_7 HEDU + \beta_8 HWORK + \beta_9 HLHOME + \beta_{10} HPVISIT + \beta_{11} GENHH + \beta_{12} WIND + \beta_{13} SAY + \beta_{14} FSTRUCT + \beta_{15} HINSUR + \beta_{16} RESIDE) \quad \ldots\ldots\ldots\ldots\ldots (1)$$

$$SUFIRONS = f(\gamma_0 + \gamma_1 WAGEM + \gamma_2 WEDU + \gamma_3 WWORK + \gamma_4 ETPREG + \gamma_5 BORD + \gamma_6 HAGE + \gamma_7 HEDU + \gamma_8 HWORK + \gamma_9 HLHOME + \gamma_{10} HPVISIT + \gamma_{11} GENHH + \gamma_{12} WIND + \gamma_{13} SAY + \gamma_{14} FSTRUCT + \gamma_{15} HINSUR + \gamma_{16} RESIDE) \quad \ldots\ldots\ldots (2)$$

The operational definitions of the variables have been given in table-1.

Table 1: Operational Definitions of the Variables used in Binary Logit Models

Variables	Definitions
Dependent Variable	
IRONS (Iron Supplementation)	If the woman has received iron supplementation in the last pregnancy = 1,otherwise = 0
SUFIRONS (Sufficient Iron Supplementation)	If the woman has received sufficient iron supplementation in the last pregnancy = 1,otherwise = 0
Explanatory variables	
Individual Characteristics	
WAGEM (Woman's age at first marriage)	Woman's age at first marriage in completed years
WEDU (Woman's education)	Illiterate = 0, Primary = 1, Secondary = 2, College and higher = 3
WWORK (Woman's work status)	Working = 1, otherwise = 0
Disease-related Characteristics	
ETPREG (Ever terminated pregnancy)	Yes = 1, No = 0
BORD (Birth-order of the child)	Birth-order of the child of last pregnancy
Household Characteristics	
HAGE (Husband's age)	Husband's age in completed years
HEDU (Husband's education)	Illiterate = 0, Primary = 1, Secondary = 2, College and higher = 3
HWORK (Husband's work status)	Working = 1, otherwise = 0
HLHOME (Husband's living in home)	Yes = 1, No = 0
HPVISIT (Husband's presence during prenatal visit)	Yes = 1, No = 0
GENHH (Gender of head of household)	Male = 1, Female = 0
WIND (Wealth index)	Poorest = 0, Poorer = 1, Middle = 2, Richer = 3, Richest = 4
Community Characteristics	
SAY (Final say on woman's health-care)	Someone else = 0, Husband alone = 1, Woman and husband = 2, Woman alone = 3
FSTRUCT (Family structure)	Combined = 1, Nuclear = 0
HINSUR (Household covered by health insurance)	Yes = 1, No = 0
Regional Characteristics	
RESIDE (Place of residence)	Capital and large city = 0, Small city = 1, Town = 2, Countryside = 3

4. Results

The results of binary logistic regressions of iron supplementation of the women are shown in table-2. Majority of the results are consistent with conceptual implications of iron supplementation of the women.

Table 2: Result of Binary Logistic Regression for Iron Supplementation of Women in India

Variables	Coefficient	Std. Error	P-value
Woman's age at first marriage [Continuous]			
	.012	.005	.019*
Woman's education [No education as reference]			
Primary	.426	.049	.000*
Secondary	.539	.045	.000*
Higher	1.108	.102	.000*
Woman's working status [No working status as reference]			
Yes	.142	.036	.000*
Ever terminated pregnancy [No as reference]			
Yes	.034	.042	.410
Birth-order of child [Continuous]			
	-.105	.012	.000*
Husband's age [Continuous]			
	.005	.003	.099**
Husband's education [No education as reference]			
Primary	.205	.053	.000*
Secondary	.123	.046	.008*
Higher	.395	.077	.000*
Husband's working status [No working status as reference]			
Yes	-.162	.147	.271
Husband living in home [No as reference]			
Yes	.008	.070	.912
Husband's presence during prenatal visit [No presence as reference]			
Yes	.244	.034	.000*
Gender of head of household [Female as reference]			
Male	.054	.061	.375
Wealth Index [Poorest as reference]			
Poorer	-.146	.056	.009*
Middle	-.121	.056	.032*
Richer	-.149	.062	.016*
Richest	.194	.075	.010*
Final say on woman's health-care [Someone else as reference]			
Woman	.269	.068	.000*
Woman and husband	.118	.066	.074**
Husband alone	.235	.067	.000*
Family structure [Nuclear as reference]			
Combined	.030	.035	.382
Household covered by health insurance [No cover as reference]			
Yes	.243	.088	.006*

Table 2: Continued Place of residence [Capital and large city as reference]			
Small City	-.233	.073	.001*
Town	-.245	.056	.000*
Countryside	-.062	.050	.216
C	.381	.163	.020*
No. of observations = 25999			

*represents 5 percent and ** represents 10 percent level of significance.

Out of sixteen variables, eleven have been emerged as significant determinants of iron supplementation in Indian women. They are woman's age at first marriage, woman's education, woman's work status, birth-order of child, husband's age, husband's education, husband's presence during prenatal visit, final say on woman's health-care, wealth index, household covered by health insurance and place of residence. The ever terminated pregnancy, husband's working status, husband's living in the household, gender of head of household and family structure (nuclear or combined) have shown no significant effect on the likelihood of iron supplementation.

Table 3: Result of Binary Logistic Regression for Sufficient Iron Supplementation of Women in India

Variables	Coefficient	Std. Error	P-value
Woman's age at first marriage [Continuous]			
	.016	.005	.001*
Woman's education [No education as reference]			
Primary	.164	.054	.002*
Secondary	.363	.048	.000*
Higher	.838	.076	.000*
Woman's working status [No as reference]			
Yes	.017	.036	.634
Ever terminated pregnancy [No as reference]			
Yes	-.019	.040	.642
Birth-order of child [Continuous]			
	-.137	.069	.000*
Husband's age [Continuous]			
	.024	.003	.000*
Husband's education [No education as reference]			
Primary	.024	.062	.695
Secondary	.009	.055	.874
Higher	.012	.071	.864
Husband's working status [No as reference]			
Yes	-.011	.149	.940
Husband living in home [No as reference]			
Yes	.074	.066	.268
Husband's presence during prenatal visit [No as reference]			
Yes	.430	.036	.000*

Table 3: Continued			
Gender of head of household [Female as reference]			
Male	.029	.055	.600
Wealth Index [Poorest as reference]			
Poorer	.068	.069	.328
Middle	.265	.067	.000*
Richer	.526	.069	.000*
Richest	.964	.077	.000*
Final say on woman's health-care [Someone else as reference]			
Woman	.080	.069	.244
Woman and husband	.085	.067	.209
Husband alone	.179	.069	.009*
Family structure [Nuclear as reference]			
Combined	.019	.034	.580
Household covered by health insurance [No as reference]			
Yes	.093	.064	.147
Place of residence [Capital and large city as reference]			
Small City	-.162	.065	.013*
Town	-.032	.050	.520
Countryside	.036	.045	.414
C	-2.451	.164	.000*
No. of observations =19764			

Out of sixteen variables, eight have been emerged as significant determinants of sufficient iron supplementation in Indian women. They are woman's age at first marriage, woman's education, birth-order of child, husband's age, husband's presence during prenatal visit, final say on woman's health-care, wealth index and place of residence. The woman's working status, ever terminated pregnancy, husband's education, husband's living in the home, husband's working status, gender of head of household, family structure (nuclear or combined) and household covered by health insurance has shown no significant effect on the likelihood of sufficient iron supplementation.

5. Discussion

The analysis in the current study helps us to identify the socioeconomic determinants of iron supplementation and sufficient iron supplementation. In the individual characteristics, the woman's age at first marriage positively affects the likelihood of iron supplementation and sufficient iron supplementation. Age is an important determinant of woman health-seeking behavior in social perspectives. It is related with woman's awareness, information and mobility. Woman's education is also an important determinant of health-seeking behavior. In our results woman's education as a categorical variable has positively influenced the likelihood of iron supplementation and sufficient iron supplementation (see also Habib, et. al. 2009). All the categories of woman's education, i.e. primary, secondary and higher enhance the probability of both iron supplementation and sufficient iron supplementation. The higher level of education has shown the higher effect. The explanation may be that educated women seek prenatal-care

services and have ability to use health-care inputs to maintain their health (Beeckman, et. al. 2011; Habibov 2011). The traditional beliefs mentioned by Titley, et. al. (2010) and Chaudhury and Ahmed (2011) as restricting factor of iron/folic acid supplementation may by depleted by the education of the women. The education impacts individuals' behavior regarding health. It enhances women's decision making power and confidence. The educated women may take preventive health-care measures, as they have more control over their lives. They have positions in the household to take decisions regarding their own as well as of their children's health. Another explanation may be that education increases overall awareness including health and health-care utilization (Khan and Raza 2013). The influence of cultural norms as well as husband's and in-laws' imposition of decisions on women's health seeking behavior may vary by a woman's background characteristics which are associated with age and education of the woman. Therefore the influence of traditional believes, cultural norms along with husband's and in-laws' impact on the use of prenatal-care among older and more educated women may be lower than among young women and women having little or no education.

Working status of a woman works as catalyst for the autonomy, decision-making at household level, financial strength of a woman along with her mobility and social interaction. It also enhances the awareness, reach and information of health-care providers. The working women have comparatively more confidence in dealing with health-care providers. Our results have shown that working status of the women enhances the probability of iron supplementation (model-1).

Birth-order of the child has shown significant results. It negatively affects the likelihood of iron supplementation as well as sufficient iron supplementation. Such type of impact is supported by a number of studies. Women experiencing high number of births have less likelihood of maternal health-care (Habibov 2011). The possible explanation may be that during their earlier pregnancies women are more cautious and they attempt to seek maternal health-care. With the passage of time due to experience and confidence from previous pregnancies they feel less need of maternal health-care in the form of iron supplementation.

In the household characteristics, our results have shown that husband's age increases the probability of iron supplementation and sufficient iron supplementation. However, the husband's education increases the probability of iron supplementation only (model-1). All the categories of husband's education, i.e. primary, secondary and higher education enhance the likelihood of iron supplementation. Our results have further shown that the presence of husband at the time of prenatal visit increases the probability of iron supplementation as well as the sufficient iron supplementation. It may be proposed that the husband should take attention when his wife is expecting a child. For the purpose, the cultural norms in India and generally in South Asia need transformation. The husbands feel slightly ashamed in accompanying the wives during their prenatal visits. It is linked with lack of awareness and information about advantages of prenatal-care.

Wealth index expresses the socioeconomic status of the household. IDHS has developed household wealth index from several household characteristics and asset variables using principle component analysis. It has been divided into quintiles from lowest to highest. These quintiles have been included in the analysis. Our estimates have shown that probability of iron supplementation decreases with higher quintile (model 1). The possible explanation may be that women from higher quintile need lesser iron

supplementation due to their good health as belonging to higher socioeconomic households. In the second model the results are contrary to the first model. The women from higher wealth index quintile are more likely to have sufficient iron supplementation. It explains that women belonging to good socioeconomic household need less iron supplementation but if they need they have sufficient iron supplementation.

In our analysis the final say on the decision of maternal health-care has three categories, whether the final say is of woman, woman and her husband (collectively) or husband alone. The variable represents the woman's empowerment at household level. Our results have shown that the final say of the woman, woman and husband collectively and husband alone increases the likelihood of maternal health-care in the form of iron supplementation as compared to the final say of someone else. However, in the second model the final say by husband alone enhances the likelihood of sufficient iron supplementation as compared to woman alone, woman and husband collectively and someone else. The results make the effect of woman empowerment at the household level proxy by her final say on health-care dubious. Theoretically the woman's alone say on maternal health should have positive and strongest effect on both iron supplementation and sufficient iron supplementation. The result supports the idea of woman's centrality within the home, rather than autonomy from the household. It explains that autonomy paradigm has an undue emphasis on autonomous actions like final say on decision making. Such an approach ignores the fact that household members both men and women are tied together by strong emotional and structural bonds. Such type of relationship affects the decision making at the household level.

The results in the current study revealed that the women from households covered by health insurance are more likely to take iron supplementation (model 1). The explanation may that prenatal-care is supervised by health-insurance institutions. There emerged an important notion that health insurance is supervising the health-care of the women. The policy proposal may be the expansion of health insurance network along with good governance of the companies for looking after the health of the customers.

Instead of using the rural-urban locality of the household as explanatory variable, we have included the large city/capital, small city, town and country side as categorical variables for locality of the household. The locality of the household has been emerged as one of the significant determinants of iron supplementation as well as sufficient iron supplementation. The probability for iron supplementation decreases for the women living in small city and town as compared to their counterpart women living in large city/capital. Similarly the women residents of small city are 16 percent less likely to have sufficient iron supplementation as compared to those of large city/capital respectively. Such type of disparity is common characteristic of all the South Asian economies. The explanation may be that there exists lack of health-care infrastructure in small cities, towns and country side. Moreover the incomes of such households are lower as compared to their large city/capital counterparts. They are more inclined towards tradition and conventional tools to deal with health problems particularly of females due to social norms. On the other hand the households of large cities/capital have more access to education, information and awareness.

6. Conclusion and Implications

The empirical evidences emerged from this study have several implications for maternal health policy in India. Woman's education should be a part of the policy options. Along with an upsurge in maternal health-care a variety of spillover effects of women education may be obtained. The husband's characteristics like his presence while his wife visits for prenatal checkup enhances the maternal health-care particularly in iron supplementation and sufficient iron supplementation. It may be concluded that husbands have significant role in maternal health-care in India.

The socioeconomic status proxy by wealth index shows positive effect on maternal health-care in the form of iron supplementation and sufficient iron supplementation. The policy should be the provision of basic utilities to the households along with income generating programs. It would result into increased maternal health-care. The wealth index is ultimately linked with household income. The subsidy and support programs for maternal-care may be a good choice for increasing the woman health-care. The provision of health insurance may be a good option for increasing the iron supplementation.

The results demonstrated the existence of inequality in large cities/capital, small cities, towns and country side. These inequalities explained the lack of regional priorities by government. The regional variables represent the supply side factors of maternal health-care. In the large cities the maternal health-care services are available extensively as compared to the small cities and countryside. Public policy regarding provision of maternal health-care in small cities requires attention. As the residents of these localities have lower income so cost and prices be subsidized for these areas.

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